AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) A through hole examination method comprising:

setting an examination range on a surface of a workpiece, the workpiece including a through hole;

irradiating light from one side of the work piece having the through hole, the through hole being located within the examination range;

detecting passing light from another side of the work piece with a sensor camera having a plurality of imaging elements, the detected passing light being an image;

inputting the image into an image processing device;

performing a pattern matching to determine if the imaged passing light matches the examination range; and

~~subjecting the image to binarization to carry out image measurements; and~~

performing image processing to determine whether the through hole contains a foreign matter;

wherein the examination method is conducted by imaging with an imaging focal point of the sensor camera being shifted away from surface of the work piece at a distance greater than a focal length of the sensor camera.

2. (Currently Amended) A through hole examination method comprising:

setting an examination range on a surface of a workpiece;

irradiating light from one side of the work piece having a plurality of through holes, the through holes being located within the examination range;

imaging and detecting passing light from another side of the work piece with a sensor camera having a plurality of imaging elements;

inputting the imaged passing light into an image processing device;

performing a pattern matching to determine if the imaged passing light matches the examination range; and

~~subjecting the image to a binarization process to carry out image measurements; and~~

performing image processing to determine whether the through holes contains a foreign matter;

wherein the imaging is conducted with a focal point of the sensor camera being shifted away from the surface of the work piece at a distance greater than a focal length of the sensor camera to obtain images corresponding to the through holes, and areas of the images of the through holes are compared with one another.

3. (Previously Presented) The through hole examination method according to claim 1, wherein a line sensor camera is used as the sensor camera, and the camera is shifted relative to and in parallel with the work piece to detect the passing light.

4. (Previously Presented) The through hole examination method according to claim 1, wherein the imaging focal point of the sensor camera is shifted away from the surface of the work piece at the distance greater than the focal length of the sensor camera to conduct imaging such that an area of the image of the passing light is expanded.

5. (Currently Amended) A through hole examination apparatus comprising:

a light source;

a sensor camera having a plurality of imaging elements;

a table on which a work piece having through holes is mounted interposed between the light source and the sensor camera; and

an image processing device;

wherein the sensor camera is capable of imaging light passing through the through holes,

a relative position between the sensor camera and the surface of the work piece is set such that an imaging focal point of the sensor camera is shifted away from a surface of the work piece at a distance greater than a focal length of the sensor camera; and

the image processing device sets an examination range on the surface of the workpiece, receives imaging signals provided by the sensor camera, conducts pattern matching to determine if the imaged passing light matches the examination range,

~~subjects the imaged passing light to a binarization process to carry image measurements,~~ and performs a process for comparing imaged areas to determine whether the through holes contain a foreign matter.

6. (Cancelled)

7. (Previously Presented) The through hole examination method according to claim 2, wherein a line sensor camera is used as the sensor camera, and the imaging is conducted by shifting the camera relative to and in parallel with the work piece.

8. (Previously Presented) The through hole examination method according to claim 2, wherein the imaging focal point of the sensor camera is shifted away from the surface of the work piece at the distance greater than the focal length of the sensor camera to conduct imaging such that an area of an image of the passing light is expanded.

9. (Previously Presented) The through hole examination method according to claim 1, wherein the examination is conducted in an out-of-focus condition.

10. (Previously Presented) The through hole examination method according to claim 2, wherein the imaging is conducted in an out-of-focus condition.

11. (Cancelled)

12. (Previously Presented) The through examination apparatus according to claim 5, wherein the apparatus conducts imaging in an out-of-focus condition.

13. – 14. (Cancelled)